

REMARKS

Claims 1-26 are pending in this application. Claims 1-26 have been canceled and new claims 27-49 have been added. The independent claims have been amended to include what the applicant believes to be novel and inventive over the prior art of record. Specifically, claim 27 includes "wherein said first antenna and said core material define a plurality of small antenna loops having axes substantially parallel to an axis of said first coil antenna." This is discussed in the specifications in paragraph [0018]. A similar amendment has been made to independent method claim 43.

No new matter has been added by the amendments. Reconsideration of the application as amended is respectfully requested. The Examiner's objections and rejections are addressed in substantially the same order as in the referenced office action.

OBJECTIONS TO THE SPECIFICATIONS

The Examiner has objected to the Abstract as being too long. The Abstract has been amended to address this objection.

OBJECTIONS TO THE CLAIMS

The Examiner has objected to claims 1, 5 and 10 for certain informalities. Claims 1, 5 and 10 have been canceled.

REJECTION UNDER 35 USC § 102

Claims 1-26 stand rejected under 35 USC § 102(e) as being anticipated by *Thompson et al.* (US6577129). Claims 1-26 have been canceled.

10/656,683

10

NEW CLAIMS

The present invention is an apparatus for and a method of obtaining multicomponent resistivity measurements in a borehole in an earth formation. One of the novel features of the invention is the use of an antenna with its coil transverse to the longitudinal axis of the tool to enable the generation and/or detection of the transverse component of the magnetic field.

Applicant first addresses the patentability of the new claims over *Thompson*.

Thompson discloses an antenna and a shield structure for a conventional propagation resistivity logging tool in which the coil axes are parallel to the longitudinal axis of the tool. See 68 in Fig. 2.

Independent claim 27 includes a coil antenna with an axis substantially orthogonal to a longitudinal axis of the tool body. This is clearly not taught or suggested in *Thompson*.

In order for a claimed invention to be unpatentable under 34 USC § 102, a single prior art reference must disclose each and every element of the claim arranged as in the claim. This is clearly lacking in the present case. Accordingly, applicant respectfully submits that claim 27 and claims 28-42 that depend upon claim 27 are patentable under 35 USC § 102 over *Thompson*.

Independent claim 43 includes the substantive limitations of claim 27 discussed above. Accordingly, claim 43 and claims 44-49 that depend upon claim 43 are patentable under 35 USC § 102 for the same reasons that claim 27 is patentable under 35 USC § 102 over *Thompson*.

In the Written Opinion accompanying the International Search Report, US5530358 to *Wisler et al.* was cited for lack of novelty of the original claims. *Wisler*, like *Thompson* has the antenna axis parallel to the tool axis.

As noted in the specifications, "Because of its high conductivity, a metal drill collar 1710 is nearly a perfect conductor for operating frequencies from a few hundred kilohertz to a few megahertz. In reaction to an electromagnetic field, the collar will produce surface currents that mute the field inside the collar 1710. As a result, the physical wire loop produces/receives no fields except in the groove areas 1914."

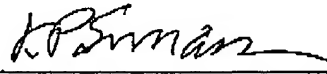
The disruption of the magnetic field is less of a problem with the z- coil orientation and hence was not recognized in reference *Wisler* or in *Thompson*. The problem is also less severe with a transverse antenna on a wireline logging tool. However, the problem is more severe with a transverse antenna on a MWD tool. For this reason, while there have been discussions of transverse antennas for MWD applications, they have been theoretical in nature and do not disclose any specific structure specifically directed towards a transverse antenna on a drill collar.

An inventive step in the present invention is a recognition that even with a transverse antenna can be replaced with numerous equivalent small antenna loops defined by the coil, the body of the drill collar and the antenna core material. This reinforcing of the equivalent small antenna loops is discussed in paragraph [0018] of the application and has not been recognized before. In this regard, the result that such a coil antenna works is a surprising result which, in hindsight, has an explanation. Applicant respectfully submits that all the pending claims of the application are patentable under 35 USC §§ 102-103 over the prior art of record.

The Commissioner is hereby authorized to charge any additional fees or credit any overpayment to Deposit Account No. 02-0429 (414-28483-US).

Respectfully submitted,

Dated 22 December 2005


Kaushik P. Sriram, Registration No. 43,150
Madan, Mossman & Sriram, P.C.
2603 Augusta, Suite 700
Houston, Texas 77057
Telephone: (713) 266-1130
Facsimile: (713) 266-8510